C Programming of Microcontrollers for Hobby Robotics

Mehmet Bodur, Asemeh Pousti

Computer Engineering Department, Eastern Mediterranean University
G.Magusa TRNC.

Abstract. This handout supplies the necessary start up information for programming microcontrollers in C language. The examples of the handout is selected on the amateur robotics applications such as line tracking by a mobile platform, on-off, proportional, proportional-integral-derivative control for servomotor control.

Keywords: PIC microcontroller, C for hobby robotics, line tracking, PID controller.

1 Introduction

This article is written for the novice robotics hobbyists who want to have a quick start in microprocessor programming, for the IJRC 2008 Robotics Competition. It is a great opportunity for a hobbyist to enjoy the competition with a home-made robot.

A *microcontroller* (or MCU) [1] is a computer-on-a-chip used to control electronic devices. It is a type of microprocessor emphasizing self-sufficiency and cost-effectiveness, in contrast to a general-purpose microprocessor used in a PC. A typical microcontroller contains all the memory and interfaces needed for a simple application, whereas a general purpose microprocessor requires additional chips to provide the same functions.

The microcontroller applications are mainly categorized into the following fields in an alphabetic listing: Audio; Automotive; Wired communication; Computers and peripherals; Consumer Appliances; Industrial Instrumentation; Imaging and video application; Medical Instrumentation; Military and aerospace instrumentation; Mobile and wireless devices; Motor control; Security Equipments; General Purpose Devices; and Miscellaneous Applications. From these fields, robotics uses the wired and wireless communication, image processing, and motor control extensively.

A microcontroller is a must of a mechatronics device which combines intelligence, mechanical actions, and sensory devices for a goal. Robotics and Hobby Robotics are typical fields of mechatronics. In a robot, microcontrollers are embedded to implement intelligent control algorithms.

A low-end microcontroller can execute most of the robotics control algorithms. Implementation of robotics microcontroller applications requires two main components, a microcontroller and its IC-programming tool, and a convenient programming language to express the algorithms. The main objective of this article is an introduction to these item.

[C Programming Of Microcontrollers For Hobby Robotics](#)

VM Jensen

C Programming Of Microcontrollers For Hobby Robotics:

This book delves into C Programming Of Microcontrollers For Hobby Robotics. C Programming Of Microcontrollers For Hobby Robotics is an essential topic that must be grasped by everyone, from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into C Programming Of Microcontrollers For Hobby Robotics, encompassing both the fundamentals and more intricate discussions.

1. The book is structured into several chapters, namely:

    - Chapter 1: Introduction to C Programming Of Microcontrollers For Hobby Robotics
    - Chapter 2: Essential Elements of C Programming Of Microcontrollers For Hobby Robotics
    - Chapter 3: C Programming Of Microcontrollers For Hobby Robotics in Everyday Life
    - Chapter 4: C Programming Of Microcontrollers For Hobby Robotics in Specific Contexts
    - Chapter 5: Conclusion

2. In chapter 1, this book will provide an overview of C Programming Of Microcontrollers For Hobby Robotics. The first chapter will explore what C Programming Of Microcontrollers For Hobby Robotics is, why C Programming Of Microcontrollers For Hobby Robotics is vital, and how to effectively learn about C Programming Of Microcontrollers For Hobby Robotics.
3. In chapter 2, this book will delve into the foundational concepts of C Programming Of Microcontrollers For Hobby Robotics. The second chapter will elucidate the essential principles that need to be understood to grasp C Programming Of Microcontrollers For Hobby Robotics in its entirety.
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